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Application No.: 09/343,092

REMARKS

Claims 12-17 are presented for examination. Claim 12 has been amended to clearly distinguish the present invention over the cited prior art. New claims 13-17 have been added, of which claims 13 and 14 include limitations previously presented in claim 12, and claims 15-17 reflect limitations of previously withdrawn claims 4, 6 and 7 respectively. Care has been exercised to avoid the introduction of new matter.

The Rejections of Claim under 35 U.S.C. §103(a)

Claim 12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Cruz-Urbe (U.S. Patent No. 4,680,595, hereinafter "Cruz-Urbe") in view of Chang (U.S. Patent No. 6,099,111), Hasegawa et al. (U.S. Patent No. 5,530,465, hereinafter "Hasegawa") and Hackleman (U.S. Patent No. 5,414,245). This rejection is traversed, and reconsideration and withdrawal thereof requested.

Amended claim 12, in pertinent part, recites "said silicon substrate includes a structure in which a plurality of silicon substrates of equal thickness are laminated." As illustrated in Fig. 1, the silicon substrate 1, in which ink nozzles and ink passages are formed, is formed by laminating a plurality of thin films (silicon substrates) which have equal thickness.

Typically, to assure fine and continuous injection of ink from the ink nozzles 5, the length of the ink passages 6 has to be bigger than that of the ink nozzles 5. The present invention forms the ink passage 6, of which length is bigger than that of the nozzle 5, by laminating a plurality of substrates having equal thickness.

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In contrast, in Cruz-Urbe, a plurality of plates 48, 52, 56, in which nozzles 34, tapered holes 68 and connector holes 66 are formed, does not have equal thickness as shown in FIG. 3, in order to provide fine and continuous ink injection from the nozzles 34. To achieve high quality ink injection, nozzles 34 are formed by punching and tapering for improvement of ejecting droplets 36, and the thickness of nozzle plate 54 should be smaller than the base plate 56 (in which tapered holes 68 are formed) and the manifold plate 52 (in which the connector holes 66 are formed). Unequal thickness of the plurality of plates 48, 52, 56 in which nozzles 34, tapered holes 68 and connector holes 66 are formed is required in Cruz-Urbe. The thickness of the restrictor plate 48 is set as 2 to 4 mils and the thickness of the manifold plate 52 is set about 20 mils. (See column 6, line 46- column 7, line 1)

Hasegawa's nozzle and ink passage 801 are formed in one substrate 107, not in a plurality of substrates (See FIG. 8B). Chang's nozzles and ink passages 7, 8 are formed in one substrate 9 as well (See FIG. 5). Moreover, Hackleman does not disclose any structure in which a nozzle or an ink passage are formed. Cruz-Urbe, Hasegawa, Chang and Hackleman, alone or in combination, fails to teach the "silicon substrate", in which nozzles 5 and ink passages 6 are formed, "includes a plurality of silicon substrates of equal thickness."

In order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 180 USPQ 580 (CCPA1974). The cited references do not render claim 12 obvious, because the references fail to teach all limitations of claim 12. Claim 12, thus, is patentable over Cruz-Urbe, Hasegawa, Chang and Hackleman.

Claims 13-17 dependent upon and including all limitations of claim 12 are patentable for the same reasons as claim 12.

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In light of the amendments and remarks above, this application is in condition for allowance, and the case should be passed to issue. If there are any questions regarding this Amendment or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

Respectfully submitted,

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